What is claimed is:

1. A method of compressing an image file comprising:

choosing an image file to be compressed and decomposing it into slices;

finding a trend line for each slice and calculating trend line information describing the trend line;

calculating for each slice a detrended image slice, by subtracting from each slice its trend line and storing the trend line information describing the trend line;

choosing a chaotic system;

applying selected digital initialization codes to the chaotic system such that each initialization code produces a periodic orbit and stabilizes the otherwise unstable periodic orbit;

generating a basic waveform for each periodic orbit such that the basic waveform is in a one-to-one correspondence to the initialization code for the periodic orbit;

selecting basic waveforms to be used with each detrended image slice and storing their corresponding initialization codes;

transforming the detrended image slice and the selected basic waveforms to a proper frequency range and storing frequency information describing the transformation;

calculating weighting factors to create a weighted sum of the selected basic waveforms to approximate each detrended image slice and storing the weighting factors; and

combining the stored trend line information, the stored initialization codes, the stored frequency information and the stored weighting factors for each detrended image slice to comprise a compressed image file.

2.   The method of compressing an image file of claim 1 further comprising the steps of removing from the weighted sum of the selected basic waveforms any selected basic waveforms not deemed necessary to approximate sufficiently well the image file and of removing the corresponding stored initialized codes.

3.   The method of compressing an image file of claim 1 further comprising the step of identifying trends over sections of compressed image file and replacing the stored weighting factors for the sections of compressed image file by a suitable function.

4.   A method of compressing a series of image files, comprising repeating the method of compressing an image file of claim 1 for each image file and replacing the stored weighting factors for each compressed image file by a suitable function.

5.   A system of compressing an image file comprising:

means for choosing an image file to be compressed and decomposing it into slices;

means for finding a trend line for each slice and calculating trend line information describing the trend line;

means for calculating for each slice a detrended image slice, by subtracting from each slice its trend line and storing the trend line information describing the trend line;

means for choosing a chaotic system;

means for applying selected digital initialization codes to the chaotic system such that each initialization code produces a periodic orbit and stabilizes the otherwise unstable periodic orbit;

means for generating a basic waveform for each periodic orbit such that the basic waveform is in a one-to-one correspondence to the initialization code for the periodic orbit;

means for selecting basic waveforms to be used with each detrended image slice and storing their corresponding initialization codes;

means for transforming the detrended image slice and the selected basic waveforms to a proper frequency range and storing frequency information describing the transformation;

means for calculating weighting factors to create a weighted sum of the selected basic waveforms to approximate each detrended image slice and storing the weighting factors; and

means for combining the stored trend line information, the stored initialization codes, the stored frequency information and the stored weighting factors for each detrended image slice to comprise a compressed image file.

6. The means for compressing an image file of claim 5 further comprising the means for removing from the weighted sum of the selected basic waveforms any selected basic waveforms not deemed necessary to approximate sufficiently well the image file and the means for removing the corresponding stored initialized codes.

7. The means for compressing an image file of claim 5 further comprising the means for identifying trends over sections of compressed image file and the means for replacing the stored weighting factors for the sections of compressed audio file by a suitable function.

8. A system for compressing an image file comprising:

a chaotic system;

a compression controller to apply selected digital initialization codes to the chaotic system to drive in onto periodic orbits and to produce a basic waveform for each periodic orbit that is in a one-to-one correspondence with the initialization code for the periodic orbit;

an image decomposer to decompose an image to be compressed into slices;

a slice data detrender to calculate for each slice a detrended image slice by subtracting from each slice its trend line and to store the trend line information;

a waveform comparator to select the basic waveforms to be used with each detrended image slice and to store their corresponding initialization codes;

a waveform weighter (i) to transform the detrended image slice and the selected basic waveforms to a proper frequency range and to store frequency information describing the transformation and (ii) to calculate weighting factors to create a weighted sum of the selected basic waveforms to approximate each detrended image slice and to store the weighting factors; and

a storage device to combine the stored trend line information, the stored initialization codes, the stored frequency information and the stored weighting factors for each detrended image slice to comprise a compressed image file.

9.   A method of decompressing a compressed image file produced according to the method of claim 1 comprising:

choosing a compressed image file;

stripping stored initialization codes out of the compressed image file and applying the stored initialization codes to a chaotic system substantially the same as the chaotic system used in producing the compressed image file to produce the corresponding basic waveforms;

stripping the stored frequency information out of the compressed image file and using the stored frequency information to transfer the basic waveform to the proper frequency range; and

combining the basic waveforms according to the stored weighting factors to produce a detrended image slice;

stripping the trend line information out of the compressed image file and using the trend line information to regenerate a trend line to add to the detrended image slice to produce an approximation of an original image slice.

10.　　A system of decompressing a compressed image file produced according to the method of claim 1 comprising:

means for choosing a compressed image file;

means for stripping stored initialization codes out of the compressed image file and applying the stored initialization codes to a chaotic system substantially the same as the chaotic system used in producing the compressed image file to produce the corresponding basic waveforms;

means for stripping the stored frequency information out of the compressed image file and using the stored frequency information to transfer the basic waveform to the proper frequency range; and

means for combining the basic waveforms according to the stored weighting factors to produce a detrended image slice;

means for stripping the trend line information out of the compressed image file and using the trend line information to regenerate a trend line to add to the detrended image slice to produce an approximation of an original image slice.